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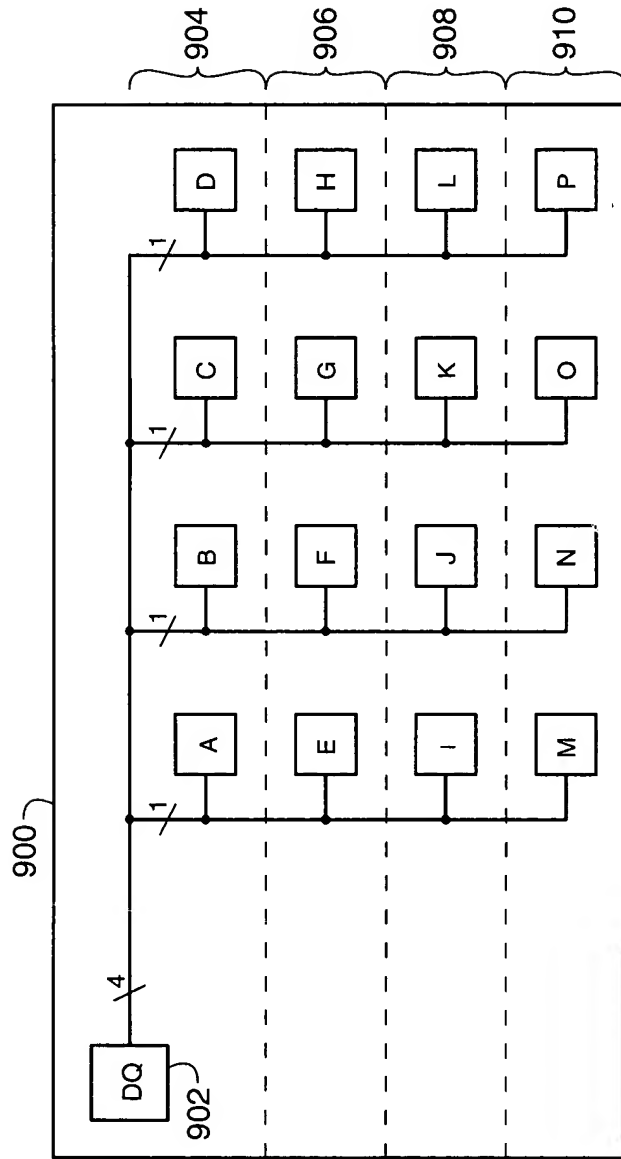


FIG. 1
(PRIOR ART)

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	CLOCK CYCLE PRIOR ART TEST METHOD	CLOCK CYCLE EXEMPLARY TEST METHOD
1	WRITE TO 1ST ADDR OF CHIPS A, B, C, & D	WRITE TO 1ST ADDR OF CHIPS A, B, C, & D
2	WRITE TO 2ND ADDR OF CHIPS A, B, C, & D	WRITE TO 2ND ADDR OF CHIPS A, B, C, & D
3	WRITE TO 3RD ADDR OF CHIPS A, B, C, & D	WRITE TO 3RD ADDR OF CHIPS A, B, C, & D
4	WRITE TO 4TH ADDR OF CHIPS A, B, C, & D	WRITE TO 4TH ADDR OF CHIPS A, B, C, & D
5	READ FROM 1ST ADDR OF CHIP A	READ FROM 1ST ADDR OF CHIPS A, B, C, & D
6	READ FROM 2ND ADDR OF CHIP A	READ FROM 2ND ADDR OF CHIPS A, B, C, & D
7	READ FROM 3RD ADDR OF CHIP A	READ FROM 3RD ADDR OF CHIPS A, B, C, & D
8	READ FROM 4TH ADDR OF CHIP A	READ FROM 4TH ADDR OF CHIPS A, B, C, & D
9	READ FROM 1ST ADDR OF CHIP B	READ FAIL FLAG FROM A
10	READ FROM 2ND ADDR OF CHIP B	READ FAIL FLAG FROM B
11	READ FROM 3RD ADDR OF CHIP B	READ FAIL FLAG FROM C
12	READ FROM 4TH ADDR OF CHIP B	READ FAIL FLAG FROM D
13	READ FROM 1ST ADDR OF CHIP C	
14	READ FROM 2ND ADDR OF CHIP C	
15	READ FROM 3RD ADDR OF CHIP C	
16	READ FROM 4TH ADDR OF CHIP C	
17	READ FROM 1ST ADDR OF CHIP D	
18	READ FROM 2ND ADDR OF CHIP D	
19	READ FROM 3RD ADDR OF CHIP D	
20	READ FROM 4TH ADDR OF CHIP D	

FIG. 2

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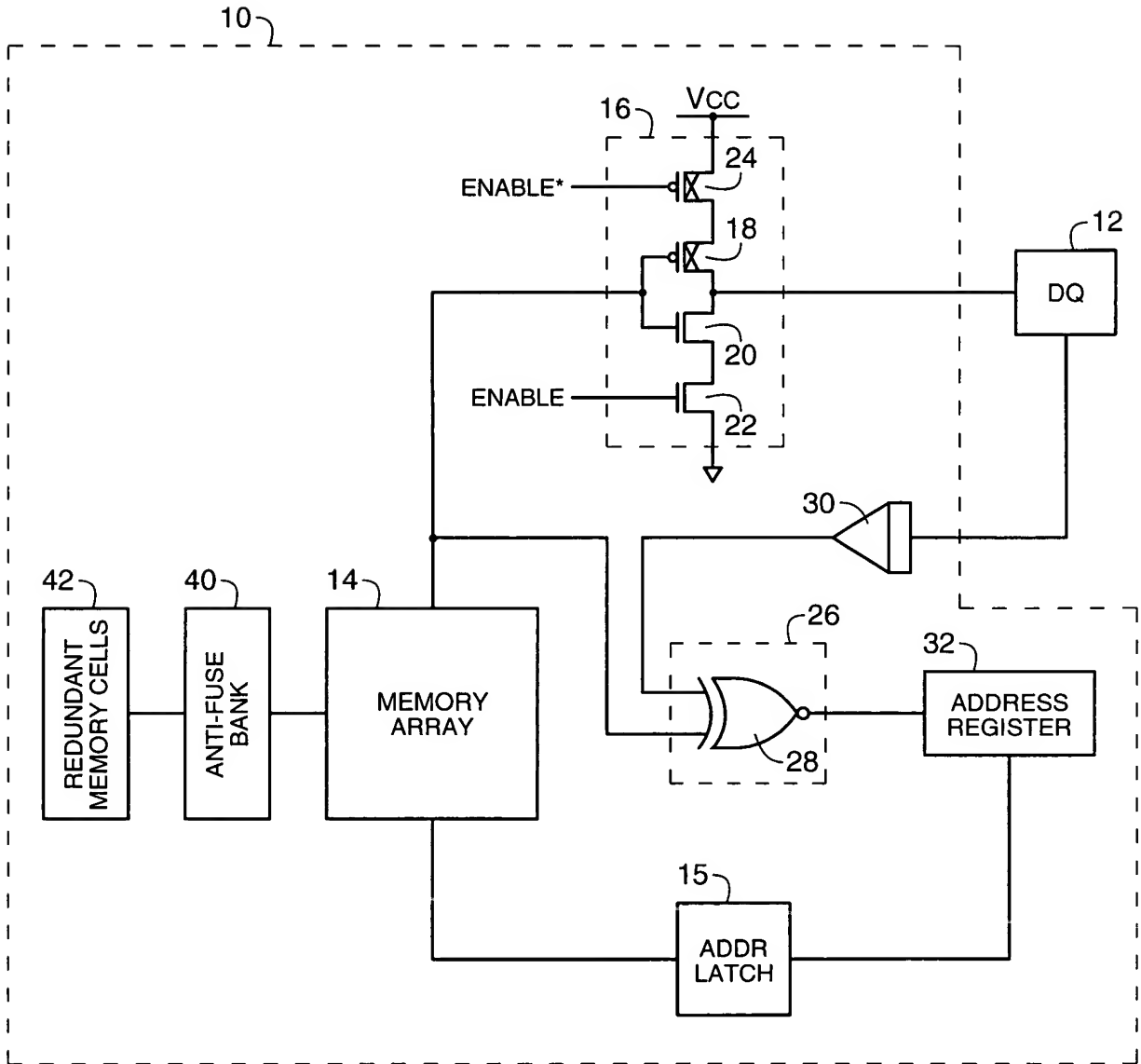


FIG. 3

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	CLOCK CYCLE PRIOR ART TEST METHOD	CLOCK CYCLE EXEMPLARY TEST METHOD
1	WRITE TO 1ST ADDR OF CHIPS A, B, C, & D	WRITE TO 1ST ADDR OF CHIPS A, B, C, & D
2	WRITE TO 2ND ADDR OF CHIPS A, B, C, & D	WRITE TO 2ND ADDR OF CHIPS A, B, C, & D
3	WRITE TO 3RD ADDR OF CHIPS A, B, C, & D	WRITE TO 3RD ADDR OF CHIPS A, B, C, & D
4	WRITE TO 4TH ADDR OF CHIPS A, B, C, & D	WRITE TO 4TH ADDR OF CHIPS A, B, C, & D
5	WRITE TO 5TH ADDR OF CHIPS A, B, C, & D	WRITE TO 5TH ADDR OF CHIPS A, B, C, & D
6	READ FROM 1ST ADDR OF CHIP A	READ FROM 1ST ADDR OF CHIPS A, B, C, & D
7	READ FROM 2ND ADDR OF CHIP A	READ FROM 2ND ADDR OF CHIPS A, B, C, & D
8	READ FROM 3RD ADDR OF CHIP A	READ FROM 3RD ADDR OF CHIPS A, B, C, & D
9	READ FROM 4TH ADDR OF CHIP A	READ FROM 4TH ADDR OF CHIPS A, B, C, & D
10	READ FROM 5TH ADDR OF CHIP A	READ FROM 5TH ADDR OF CHIPS A, B, C, & D
11	READ FROM 1ST ADDR OF CHIP B	READ FAIL FLAG FROM A
12	READ FROM 2ND ADDR OF CHIP B	READ FAIL FLAG FROM B
13	READ FROM 3RD ADDR OF CHIP B	READ FAIL FLAG FROM C
14	READ FROM 4TH ADDR OF CHIP B	READ FAIL FLAG FROM D
15	READ FROM 5TH ADDR OF CHIP B	
16	READ FROM 1ST ADDR OF CHIP C	
17	READ FROM 2ND ADDR OF CHIP C	
18	READ FROM 3RD ADDR OF CHIP C	
19	READ FROM 4TH ADDR OF CHIP C	
20	READ FROM 5TH ADDR OF CHIP C	
21	READ FROM 1ST ADDR OF CHIP D	
22	READ FROM 2ND ADDR OF CHIP D	
23	READ FROM 3RD ADDR OF CHIP D	
24	READ FROM 4TH ADDR OF CHIP D	
25	READ FROM 5TH ADDR OF CHIP D	

FIG. 4

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	CLOCK CYCLE PRIOR ART TEST METHOD	CLOCK CYCLE EXEMPLARY TEST METHOD
1	WRITE TO 1ST ADDR OF CHIPS A, B, C, D, & E	WRITE TO 1ST ADDR OF CHIPS A, B, C, D, & E
2	WRITE TO 2ND ADDR OF CHIPS A, B, C, D, & E	WRITE TO 2ND ADDR OF CHIPS A, B, C, D, & E
3	WRITE TO 3RD ADDR OF CHIPS A, B, C, D, & E	WRITE TO 3RD ADDR OF CHIPS A, B, C, D, & E
4	WRITE TO 4TH ADDR OF CHIPS A, B, C, D, & E	WRITE TO 4TH ADDR OF CHIPS A, B, C, D, & E
5	READ FROM 1ST ADDR OF CHIP A	READ FROM 1ST ADDR OF CHIPS A, B, C, D, & E
6	READ FROM 2ND ADDR OF CHIP A	READ FROM 2ND ADDR OF CHIPS A, B, C, D, & E
7	READ FROM 3RD ADDR OF CHIP A	READ FROM 3RD ADDR OF CHIPS A, B, C, D, & E
8	READ FROM 4TH ADDR OF CHIP A	READ FROM 4TH ADDR OF CHIPS A, B, C, D, & E
9	READ FROM 1ST ADDR OF CHIP B	READ FAIL FLAG FROM A
10	READ FROM 2ND ADDR OF CHIP B	READ FAIL FLAG FROM B
11	READ FROM 3RD ADDR OF CHIP B	READ FAIL FLAG FROM C
12	READ FROM 4TH ADDR OF CHIP B	READ FAIL FLAG FROM D
13	READ FROM 1ST ADDR OF CHIP C	READ FAIL FLAG FROM E
14	READ FROM 2ND ADDR OF CHIP C	
15	READ FROM 3RD ADDR OF CHIP C	
16	READ FROM 4TH ADDR OF CHIP C	
17	READ FROM 1ST ADDR OF CHIP D	
18	READ FROM 2ND ADDR OF CHIP D	
19	READ FROM 3RD ADDR OF CHIP D	
20	READ FROM 4TH ADDR OF CHIP D	
21	READ FROM 1ST ADDR OF CHIP E	
22	READ FROM 2ND ADDR OF CHIP E	
23	READ FROM 3RD ADDR OF CHIP E	
24	READ FROM 4TH ADDR OF CHIP E	

FIG. 5

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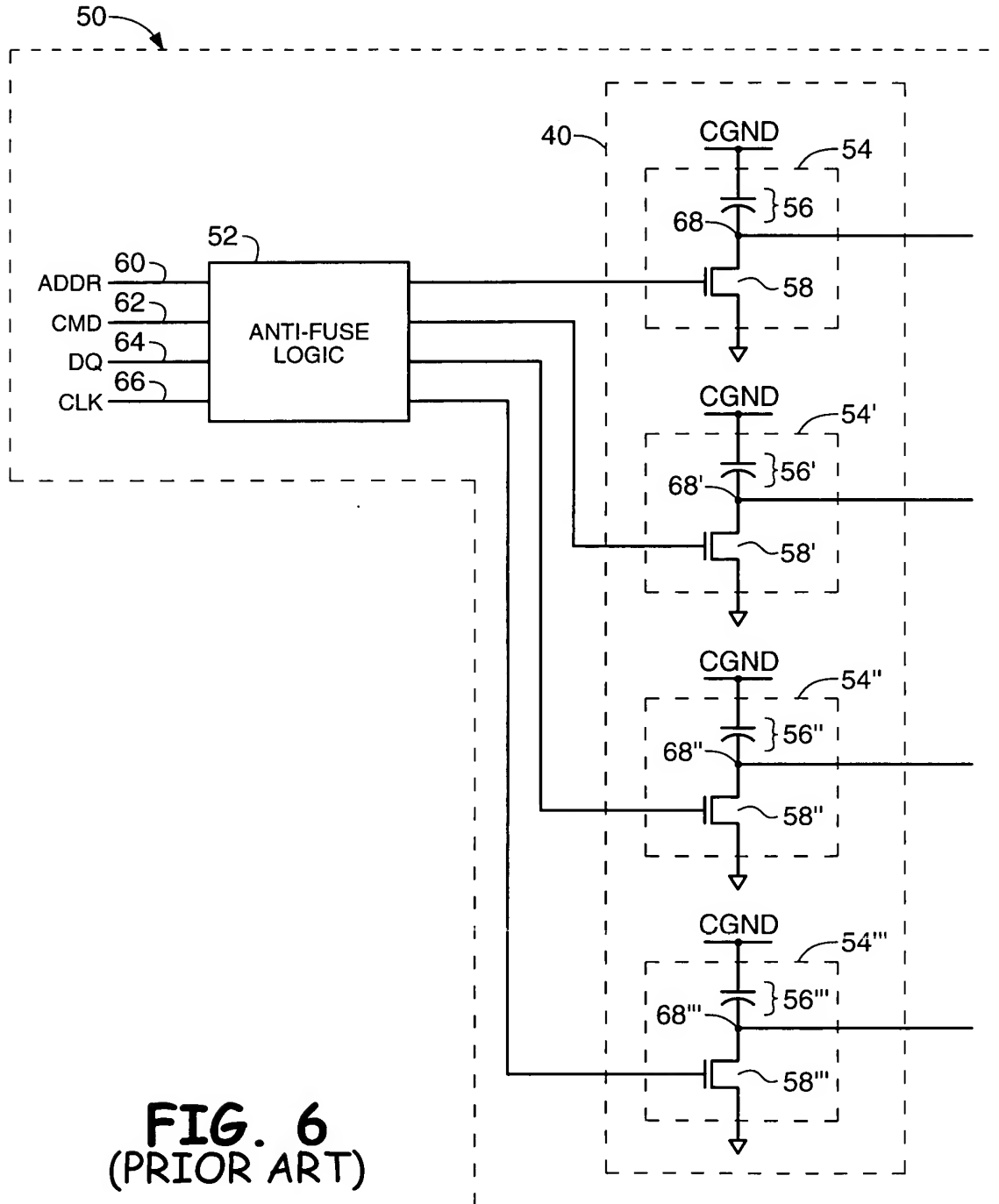


FIG. 6
(PRIOR ART)

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	A	B	C	D
1ST ADDRESS	F	P	P	P
2ND ADDRESS	P	F	P	P
3RD ADDRESS	P	P	P	P
4TH ADDRESS	P	P	P	P

FIG. 7

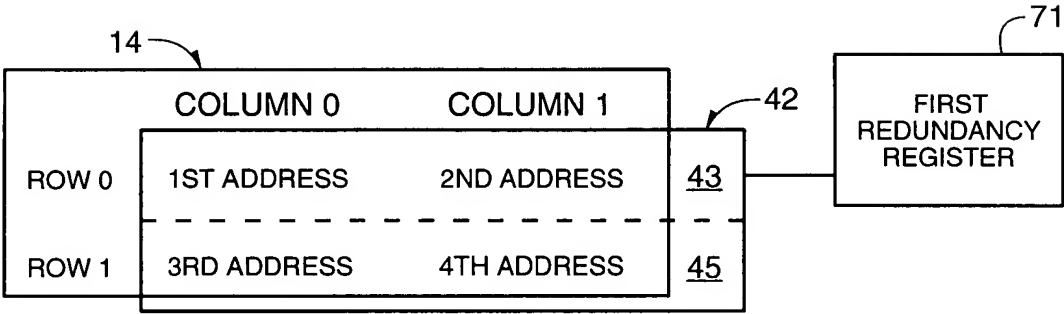


FIG. 9A

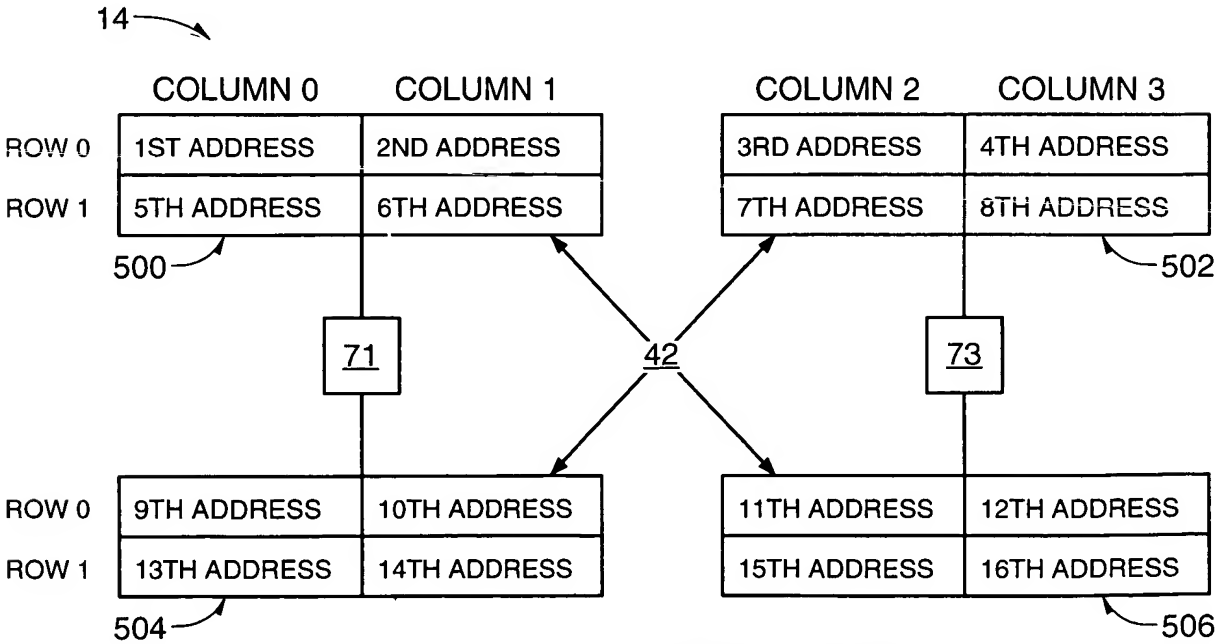


FIG. 9B

PRIOR ART REPAIR METHOD

ADDRESS	CMD	DQ
1ST ADDR TO A	BLOW 1ST FUSE	1
2ND ADDR TO A	BLOW 2ND FUSE	0
3RD ADDR TO A	BLOW 3RD FUSE	0
4TH ADDR TO A	BLOW 4TH FUSE	0
1ST ADDR TO B	BLOW 1ST FUSE	0
2ND ADDR TO B	BLOW 2ND FUSE	1
3RD ADDR TO B	BLOW 3RD FUSE	0
4TH ADDR TO B	BLOW 4TH FUSE	0
1ST ADDR TO C	BLOW 1ST FUSE	0
2ND ADDR TO C	BLOW 2ND FUSE	0
3RD ADDR TO C	BLOW 3RD FUSE	0
4TH ADDR TO C	BLOW 4TH FUSE	0
1ST ADDR TO D	BLOW 1ST FUSE	0
2ND ADDR TO D	BLOW 2ND FUSE	0
3RD ADDR TO D	BLOW 3RD FUSE	0
4TH ADDR TO D	BLOW 4TH FUSE	0

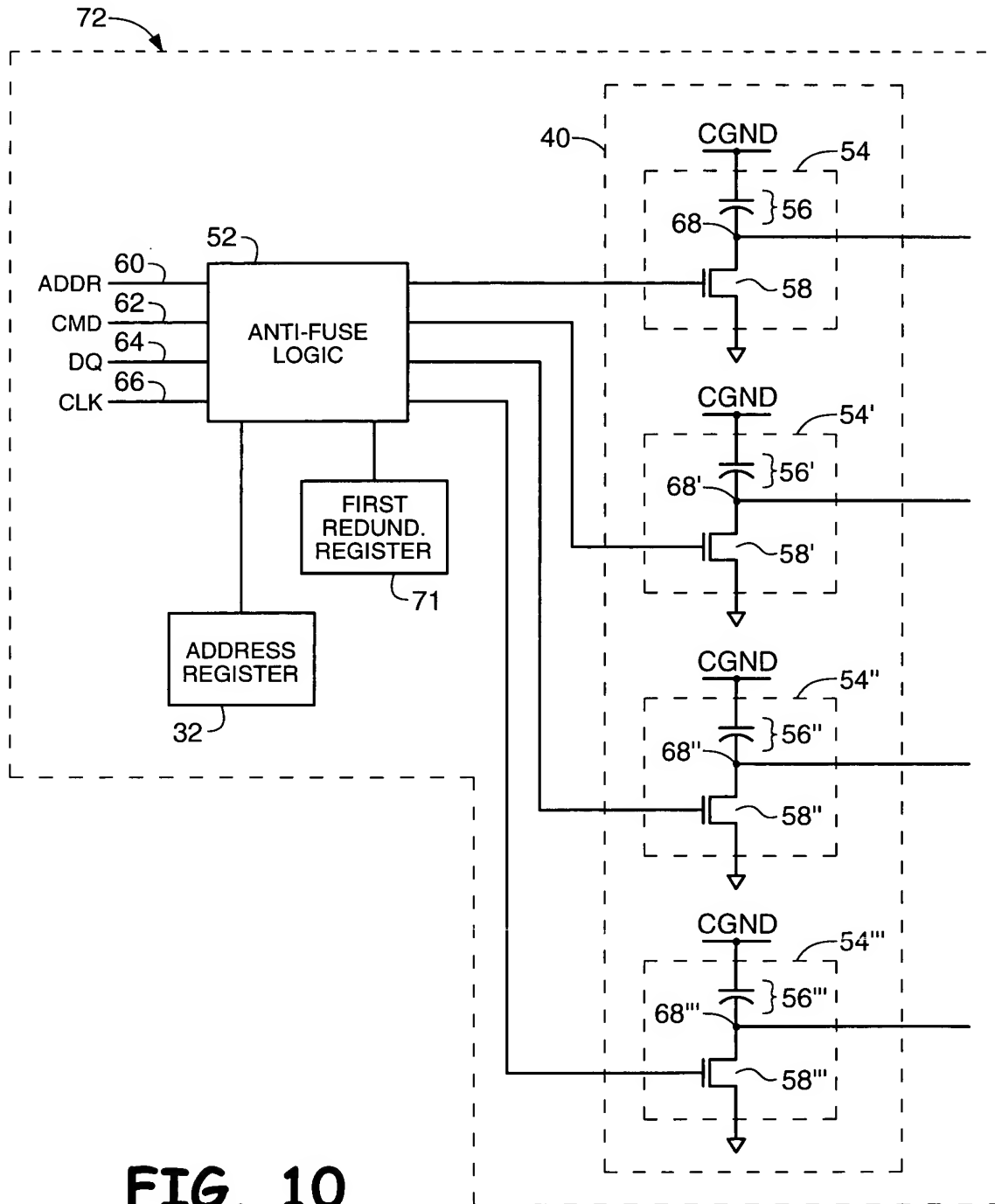
FIG. 8A
(PRIOR ART)

EXEMPLARY REPAIR METHOD

ADDRESS	CMD	DQ
COL 0 TO A-D	BLOW FUSE	DO NOT CARE
COL 1 TO A-D	BLOW FUSE	DO NOT CARE

FIG. 8B

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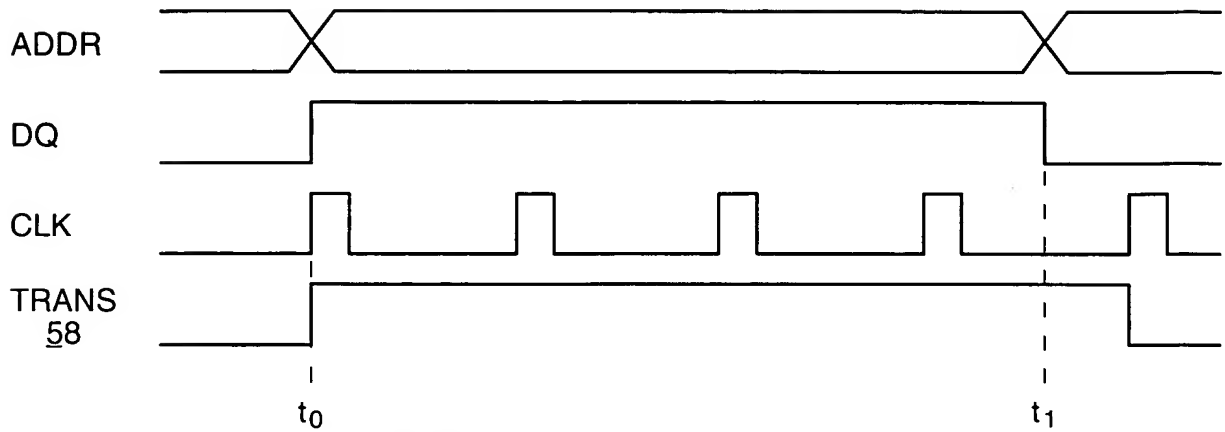


FIG. 11A (PRIOR ART)

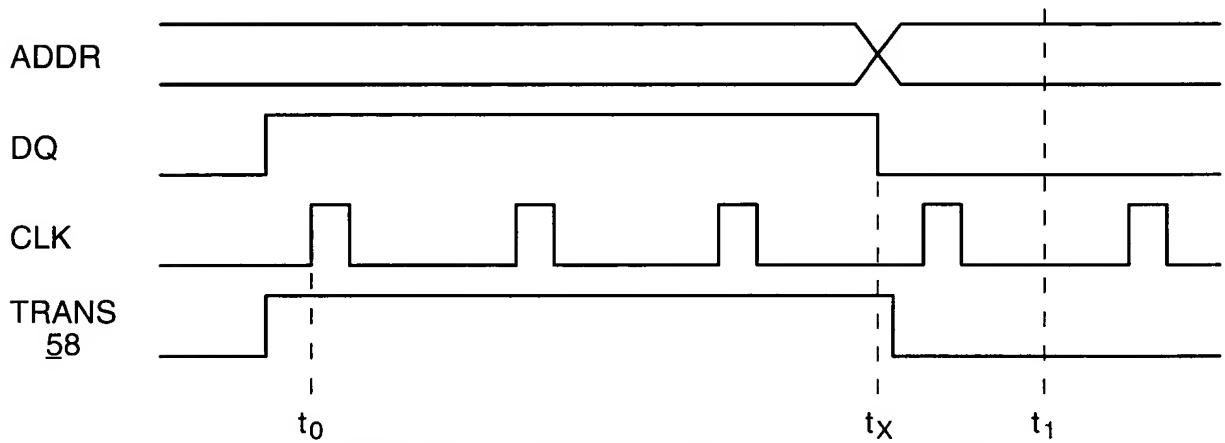


FIG. 11B (PRIOR ART)

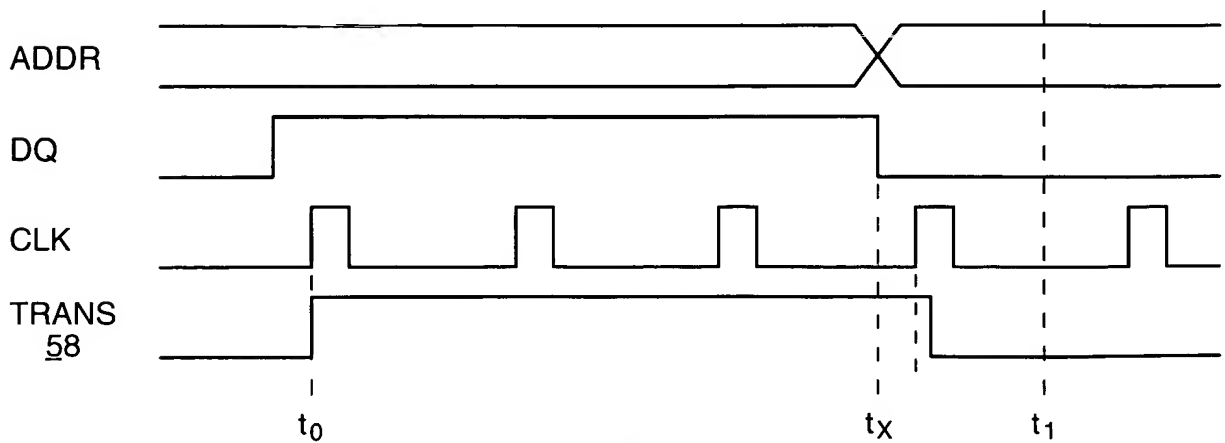


FIG. 11C (PRIOR ART)

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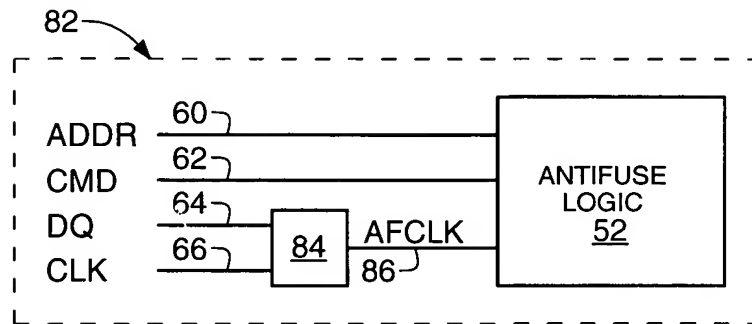


FIG. 12

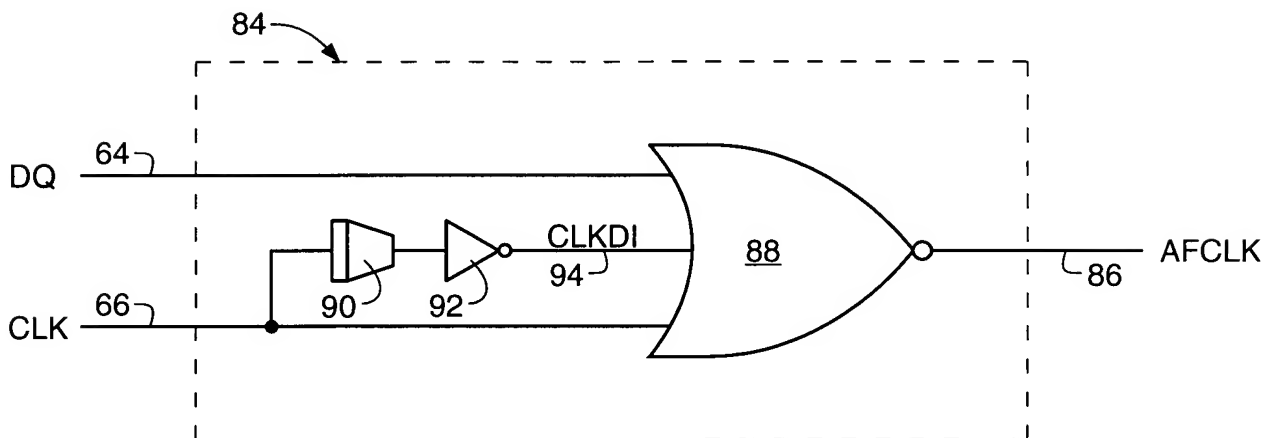


FIG. 13A

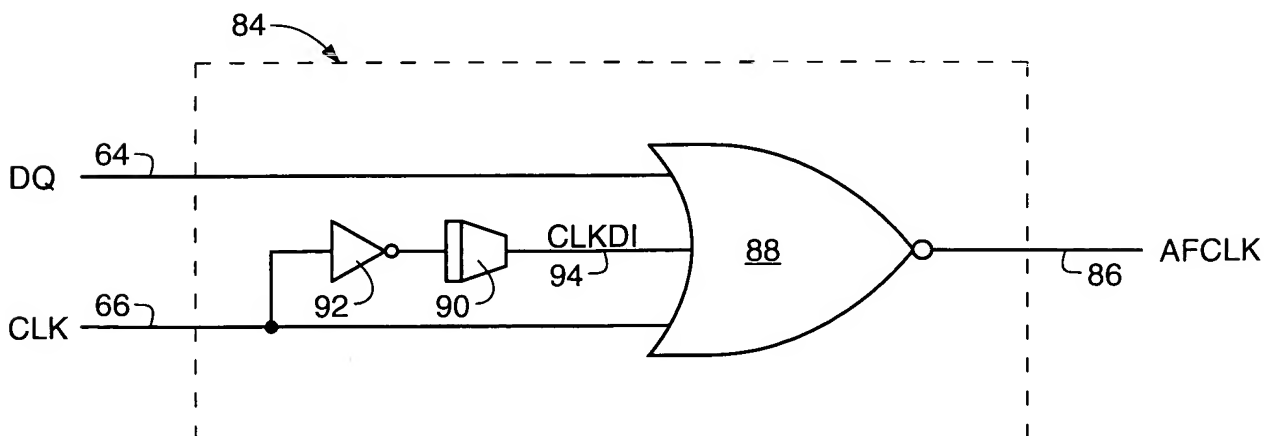


FIG. 13B

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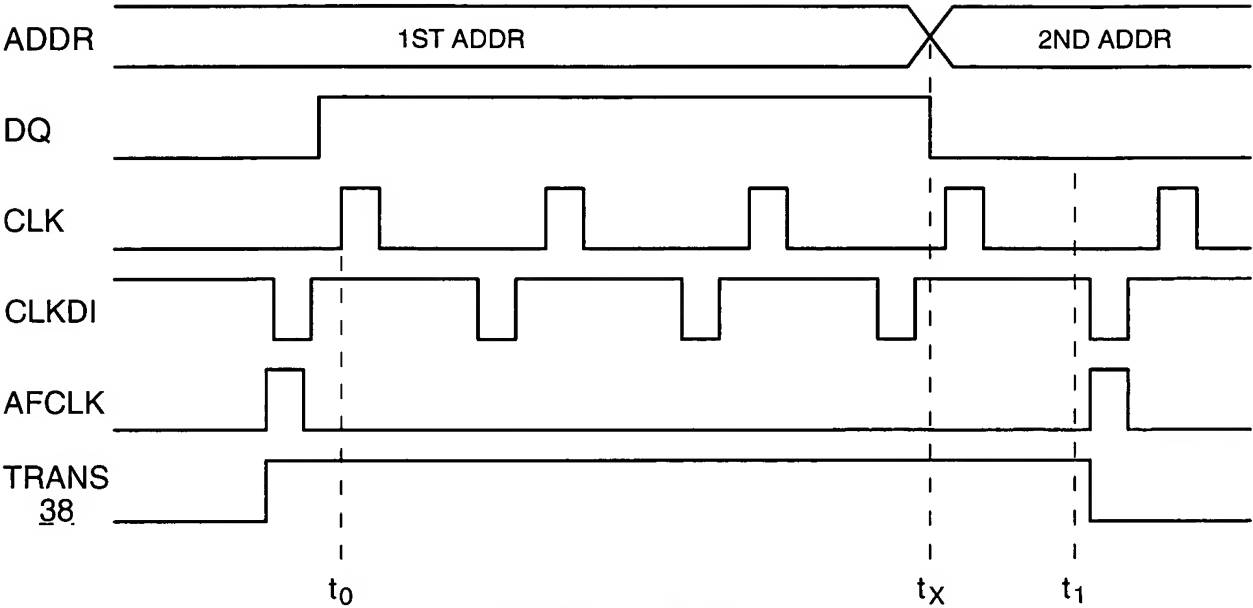


FIG. 14

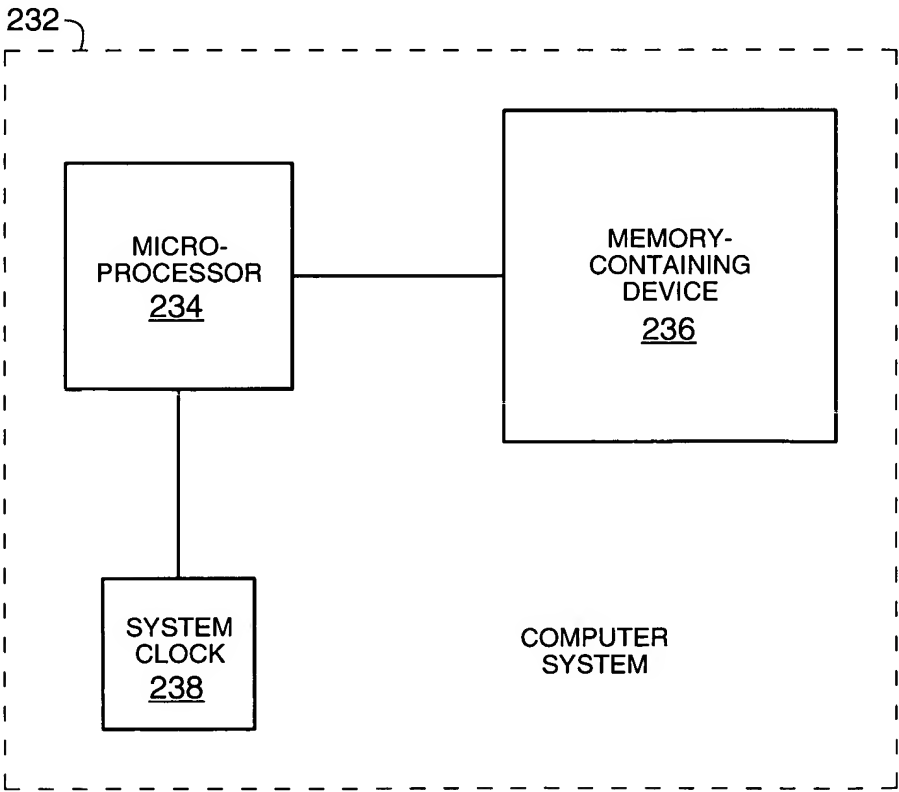


FIG. 15

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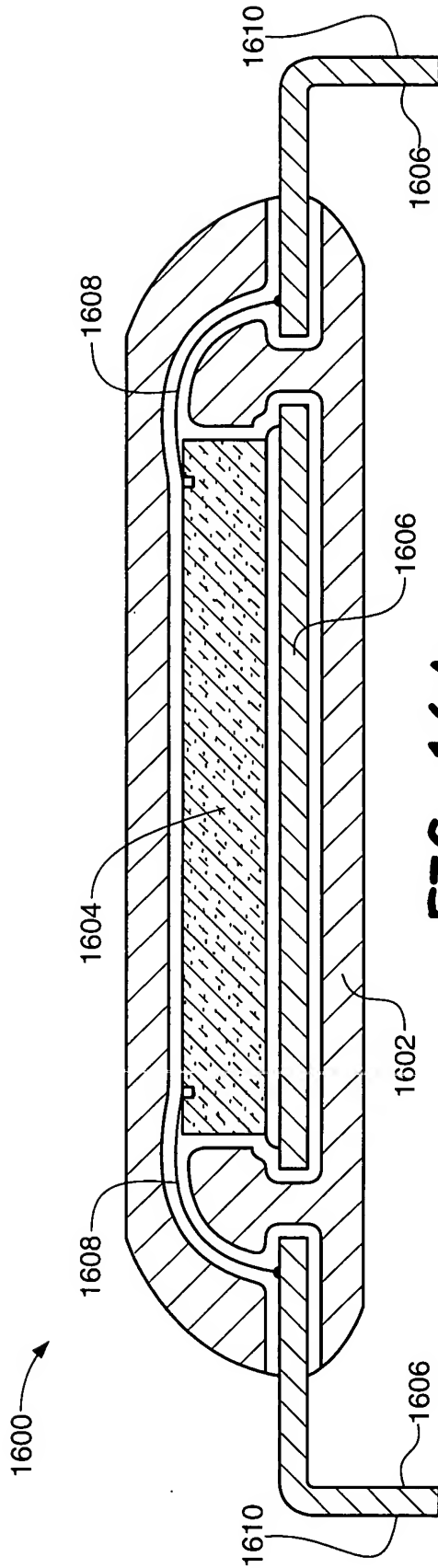


FIG. 16A

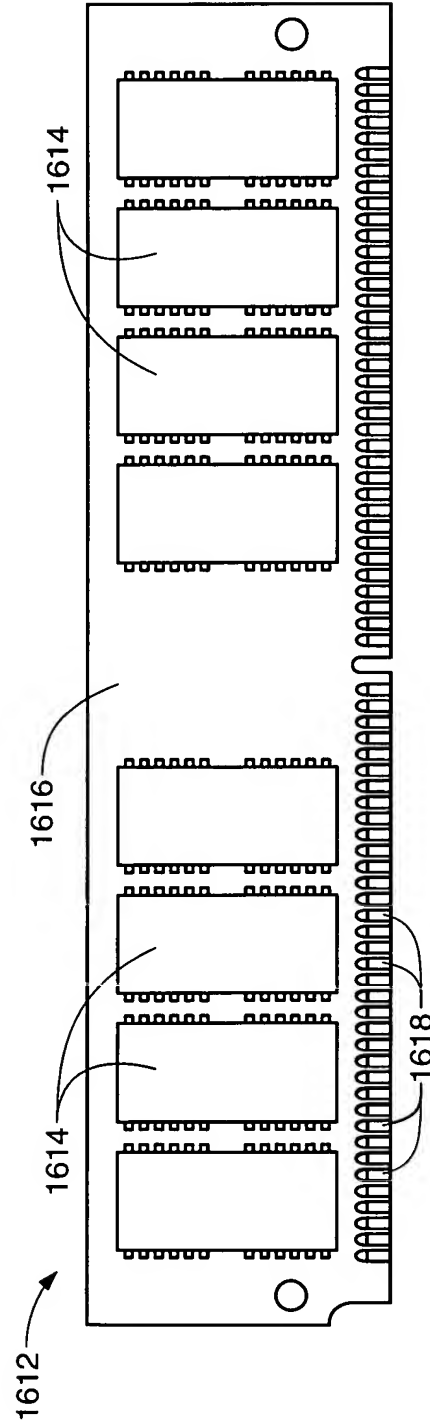


FIG. 16B

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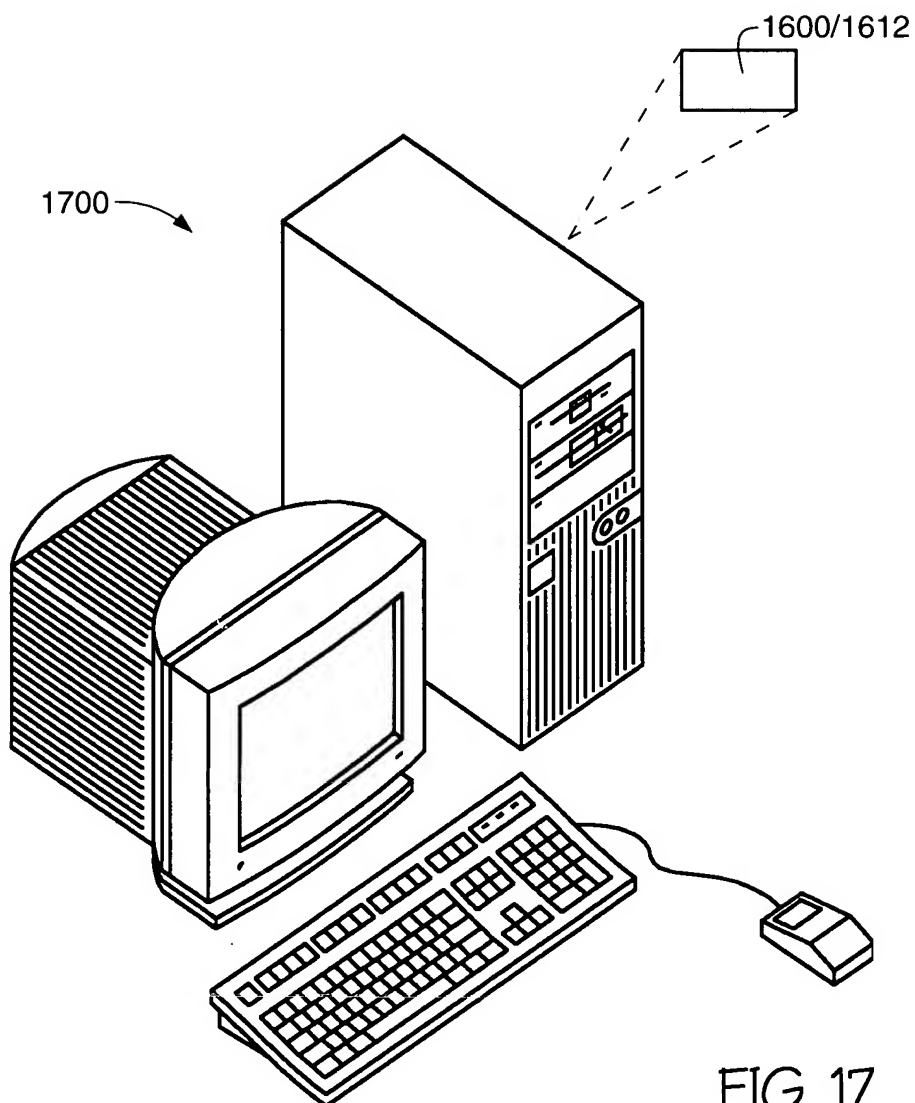


FIG. 17

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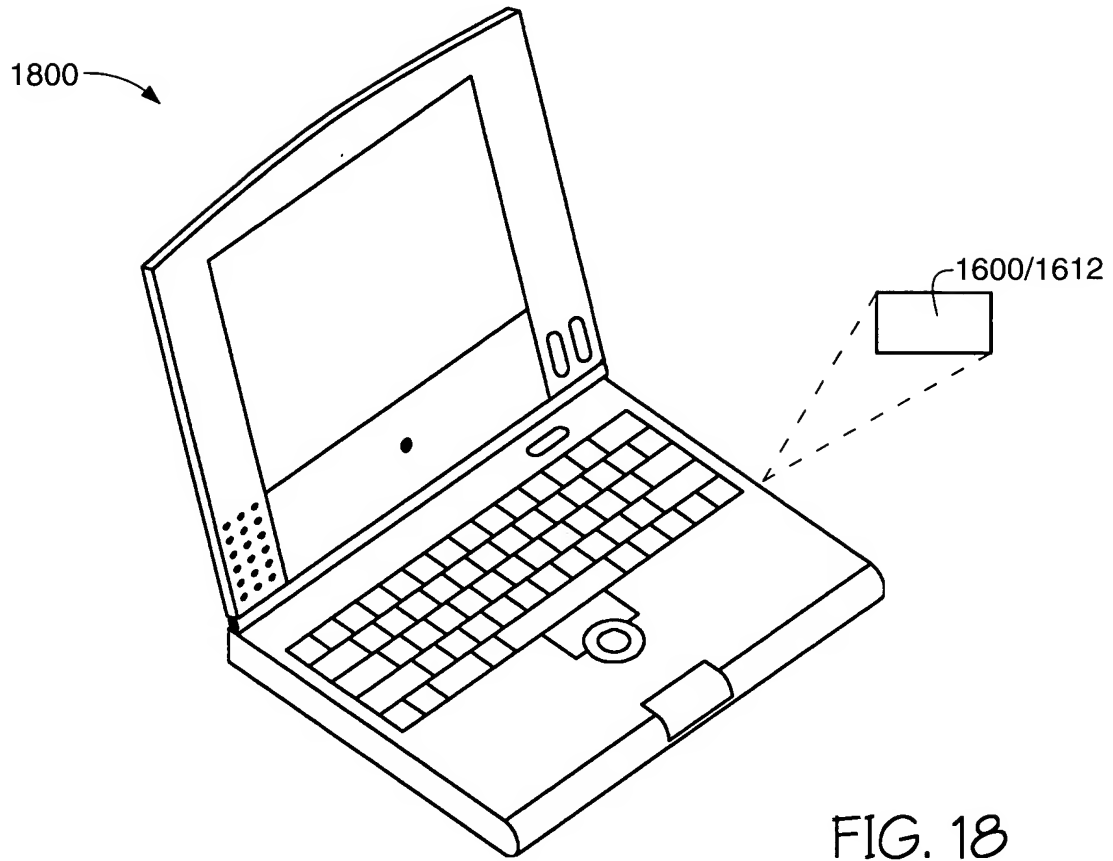


FIG. 18

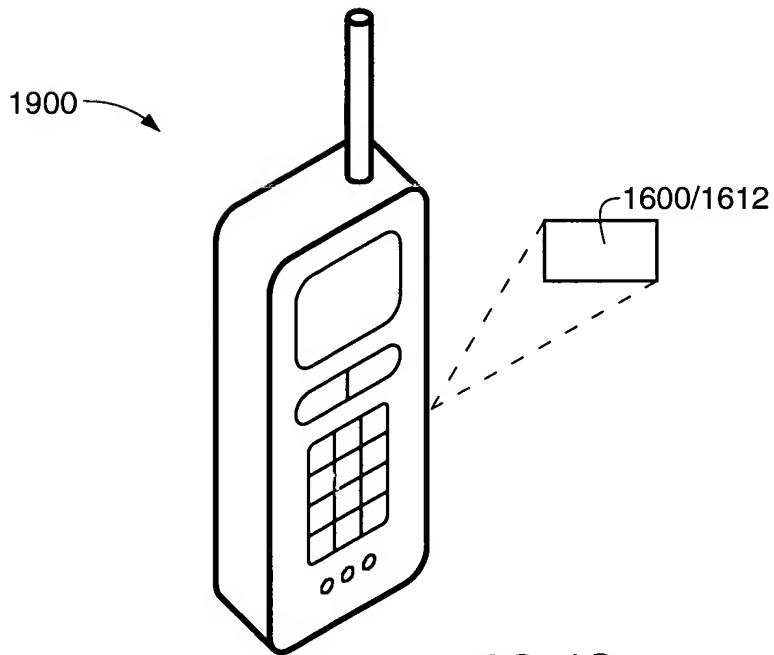


FIG. 19

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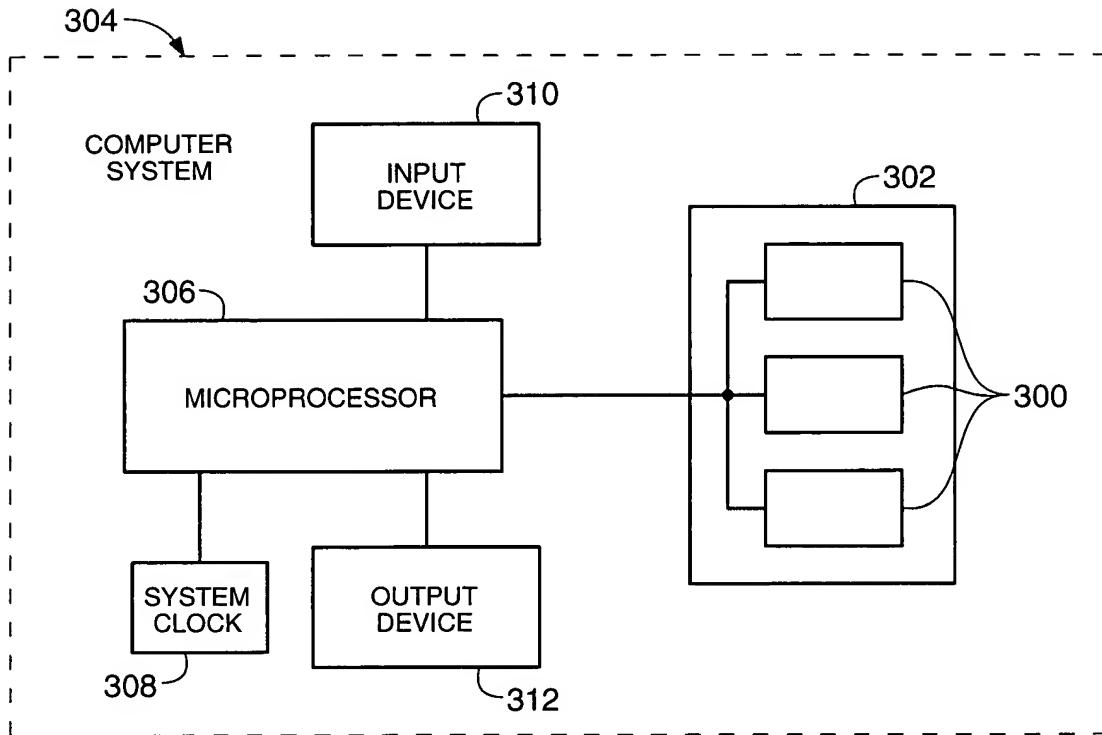


FIG. 20

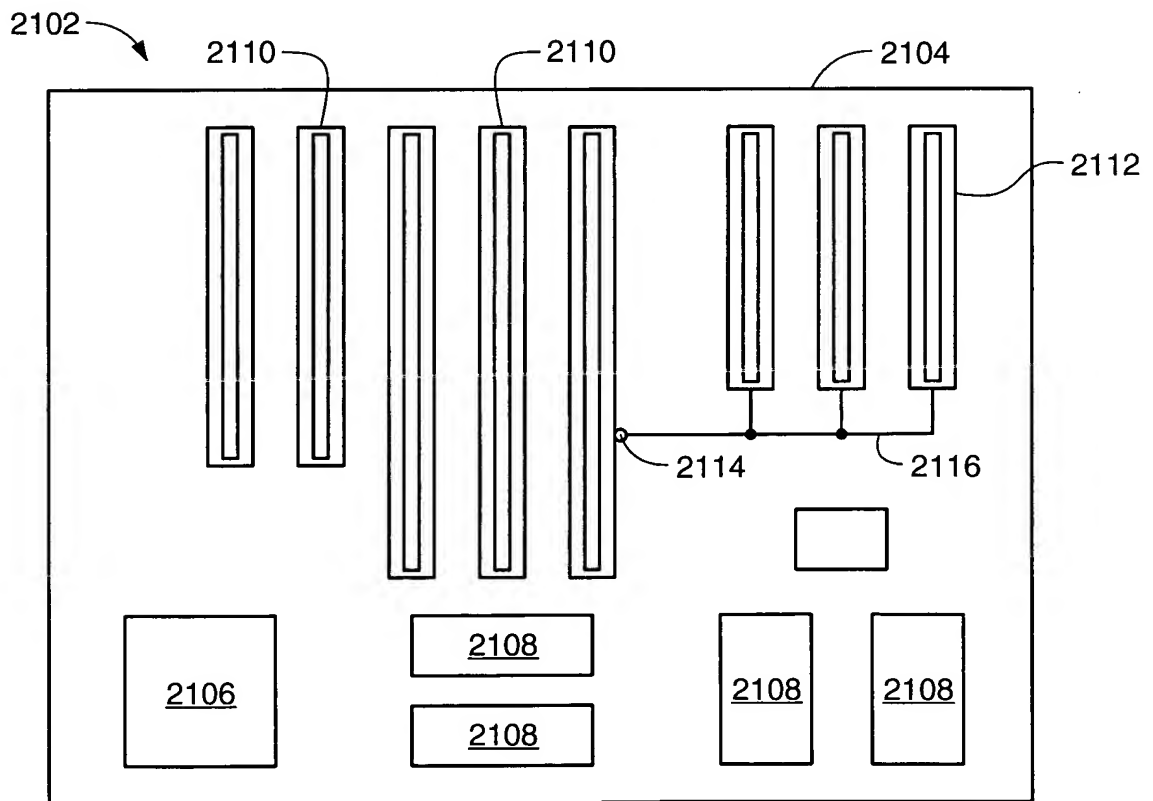


FIG. 21

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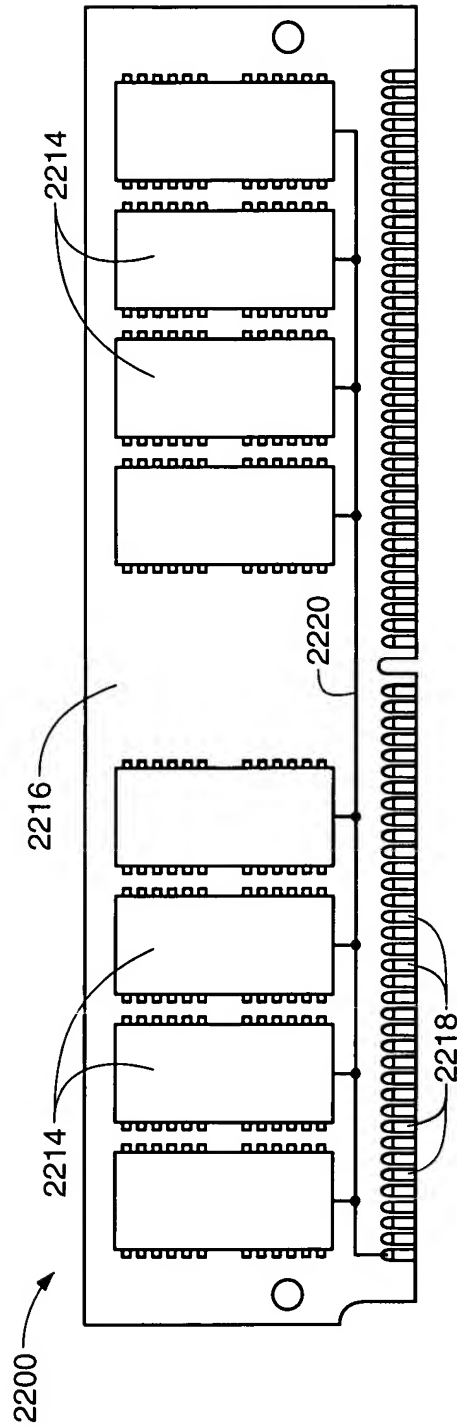


FIG. 22